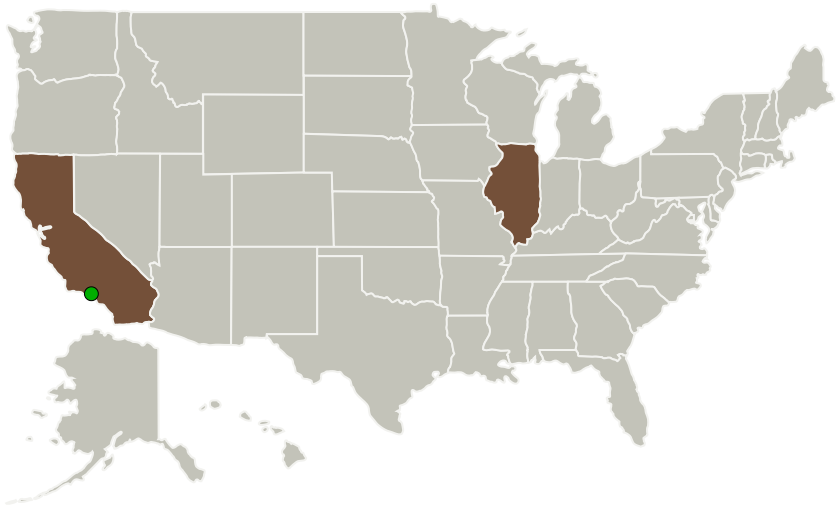
High-Efficiency, High-Power Laser Transmitter for Deep-Space Communication, Phase II

Completed Technology Project (2010 - 2013)

Project Introduction

There is demand for vastly improved deep space satellite communications links. As data rates dramatically increase due to new sensor technologies and the desire to pack even more sensors on spacecraft, it is imperative that new solutions be compact in size, light in weight, be high speed, and highly power efficient. NASA has recognized optical links offer potential improvements in power and in size due to a substantially narrower beam and smaller components. An ideal technology for such links is a laser transmitter master oscillator power amplifier (MOPA) using pulse position modulation techniques. In Phase I, a design was developed for a laser transmitter MOPA with a wall-plug efficiency of up to 23% operating at 1560nm. Operating at longer wavelength offers a number of advantages including the use of numerous off-the-shelf components. This Phase II proposal will demonstrate a working prototype of the design at a Technology Readiness Level 4 by the end of the program.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Vega Wave Systems, Inc.	Lead Organization	Industry	West Chicago, Illinois
Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations	
California	Illinois

Project Transitions

July 2010: Project Start

June 2013: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/139077)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Vega Wave Systems, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

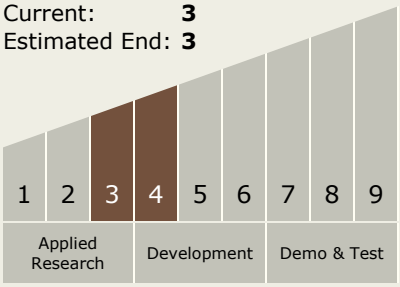
Carlos Torrez

Principal Investigator:

Anthony L Moretti

Technology Maturity (TRL)

Start: **4**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - TX05.1 Optical Communications
    - TX05.1.3 Lasers

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System